International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 7 Issue 2, March-April 2023 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Knowledge, Attitude and Practice of Workers towards Accident Prevention in a Selected Construction Company, Kano State, Nigeria

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ABSTRACT

Accidents and injuries are increasing and growing health problems in construction work places, especially in the developing countries, and they often lead to death and disability. This study focuses to determine the knowledge, attitude and practice of workers towards accident and injury prevention and control, at Haddock Engineering and Construction Company in Madobi Local Government Area, Kano State, Nigeria. A total of 120 subjects were interviewed with the use of questionnaires. The mean age of the subjects was 30.73±8.4. About 50.8% of the workers interviewed had less than 5 years working experience while 15% had above 10 years working experience. When questioned about knowledge of accident and injury prevention measures, 55.8% of the workers was aware of the prevention measures while 44.2% were not aware. Also 44.2% of the workers used personal protective devices while 55.8% did not use personal protective devices. Face masks was the most common personal protective device worn by 45.8% of the workers. Other devices worn include hand gloves, goggles and helmets. About 55.8% of the workers reported having experienced minor injuries at work place while 19.2% reported severe injuries. Seminars and workshops to educate workers on accident and injury prevention measures and the use of Physical Protective Equipment (PPE) are advocated.

KEYWORDS: *Occupational Hazard, Accident, Control, Prevention, Injuries, Safety*

How to cite this paper: Amadi Chinasa | Christopher C. A. Okereke | Sani S. Aliyu | Nasir A. Umar "Knowledge, Attitude and Practice of Workers towards Accident Prevention in a Selected Construction Company, Kano State, Nigeria" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-7 | Issue-2, April 2023, pp.894-924, URL: www.ijtsrd.com/papers/ijtsrd55125.pdf

IJTSRD55125

INTRODUCTION

Construction industry is the hub of social and economic development in all countries of the world. Though, the construction industry contributed only about 1.98% of the total Gross Domestic Product (GDP) to the Nigeria economy in 2009, its importance and roles in the development of the economy of any nation can never be disputed (National Bureau of Statistics, 2010). However, when compared with other labor-intensive industries, construction industry has historically experienced a disproportionately high rate of disability, injuries and fatalities for its size (Hinze, 1997).The industry alone produces 30% of all industrial fatal accidents across the European Union (EU), yet it employs only 10% of the working population (McKenzi-Gibb, and Bouchlaghem, 1999). In the United States of America (USA), the construction industry accounts for 22% of all fatal accidents (CheHassan, Basha, and Hanafi 2007). In other countries such as Japan, United Kingdom (UK) and Ireland, the situation is not better. Bomel, (2014) notes that in Japan, construction accidents account for 30%-40% of the overall industrial accidents, with the total being 50% in Ireland and 25% in the United Kingdom (UK). This situation is worse in the developing countries, particularly Nigeria where there are no reliable sources of data for such accident records. Currently, Nigeria is relatively experiencing strong growth in construction activities. Unfortunately, anecdotal evidence shows that the enforcement of health and safety regulations is not a mainstream activity in Nigeria. Reacting to this state of affairs, Idoro (2014)

and Idoro (2018) argue that the framework of existing occupational and health conditions in Nigerian construction industry is grossly fragmented and inadequately enforced. Idoro (2014) therefore concludes that good health and safety conditions constitute good and safe business practice in construction. Generally, the integration of health and safety measures into the total quality management system within the construction sector could significantly contribute to cost efficiency, quality assurance, environmental sustainability, better employee-employer relations and satisfaction. Nevertheless, divergent perceptions, behaviors and actions exhibited by construction workers lead to serious accidents on site. This state of affairs has been linked to different cultural backgrounds. These cultural differences, according to authors (Ali, 2006; Che-Hassan et al., 2014; Ismail; Hashim, Ismail, and Majid 2013) have significant impacts on industrial safety climate. The authors further argue that adequate consideration of these differences help to understand different approaches to accident prevention and safety management. Ngowi and Mothibi (2017) found that cultural differences were the major reason for viewing safety procedures differently on construction sites in Botswana. Given the above scenario, the need for a proper investigation into the impact of national culture on the Nigerian construction safety climate is imperative (Okolle and Okoye, 2017).

Haddock Quest Engineering and Construction Company is a foreign company of the Lebanese based in Nigeria and one of the existing powerful and hardworking companies that are operating under licence with Cooperate Affairs Commission (CAC) of Nigeria. The main work of this company is road construction and repair and building of housing estates. The company is based in Madobi Local Government Area of Kano State, Nigeria. It comprises people from different parts of Nigeria, speaking different languages such as Hausa, Igbo, Yoruba and other languages within the minority groups in the country.

Statement of the problem

Industries confront many problems which cause industrial accidents due to poor safety management, poor utilization of personnel protective equipment, etc. Occurrence of accidents and injuries among workers can result from poor knowledge and attitude of the workers regarding the safety conditions needed to avoid accidents and injuries.

Objectives of the study

General objectives

The aims of this study is to determine the knowledge, attitude and practice of workers towards accident prevention and control in Haddock Quest Engineering and Construction Company, Madobi Local Government Area of Kano State.

Specific objectives

1. To determine the level of knowledge among workers towards accident prevention and control
2. To determine the attitude of workers towards the use of protective devices
3. To determine the level of prevalence of accident preventive measures among workers in Haddock Quest Engineering and Construction Company
4. To determine the nature of accidents suffered by workers
5. To determine the rate/level of use of Personal Protective Equipment (PPE) among workers in Haddock Quest Engineering and Construction Company.

Research questions

1. What are the types of protective devices that Haddock Quest Engineering and Constructions uses?
2. What is the level of use of protective devices at Haddock Engineering and Construction Company?
3. What is the level of injury occurrence at Haddock Engineering and Construction Company?
4. What are the level of accident preventive measures in Haddock Engineering and Construction Company?
5. Are the workers aware of factors that predispose the occurrence of accident and injury at their workplace?

Significance of study

The research may serve as an important document which may be used in the community, government and non-governmental organizations for their contribution in the prevention and control accident. It will form a body of knowledge to health safety.

Scope of study

The scope of this study covers workers at Haddock Quest Engineering and Construction Company Kano branch Nigeria, their knowledge, attitude and practice towards accident prevention and control.

Prevention and Control of Industrial Accidents

The need for accident prevention is to protect and prevent risk and danger that result in any working environment. Osanyinbemi, (2015) classified prevention of accident into three, which include:

A. Pre-Accident Strategies: This contains all efforts toward accident prevention, it involved two ways:

1. Safe Place: This refers to safe premises, process, equipment, and material, system of work, access

road transportation, and proper storage, deposal of material and adequate supervision of workers.

2. **Safe Person**: That is the proper use of safety devices by the worker, care, vulnerability, personal hygiene etc.

B. **Post-Accident Strategy**: This refers to step or action taken after accident has happened to help the management to know the causes and the sources of accident e.g. investigation and finding of the causes of accident. The cause may be due to mechanical fault, poor supervision and training.

C. **Collateral Strategies**: This contains effort relevant to the health, safety and welfare of the workers who are injured, e.g. rehabilitation of workers and compensation. This strategy depends on the co-operation and effective involvement of the management of workers in safe activities (Osanyingbemi, 2015). However psychological basis of accident prevention must be taken into consideration.

Injury Prevention

People are injured in the roadways, in workplaces, in homes and during leisure activities. No group within a society is spared, although some are at more risk than others. A significant injury can change the lives of victims and other families often permanently. Prevention of injury involves:

Primordial and Primary Prevention: these are efforts directed at removing the circumstances leading to injuries. The usual strategies would consist of IEC activities on prevention of injury geared towards protecting one from injuries

Secondary Prevention: Immediate care is needed once an injury occurs. Immediate resuscitation, first aid, triage and quick referral, and early hospital care are cornerstone of secondary prevention. This is aimed at reducing the severity and complication of injury as well as to prevent death.

Tertiary Prevention: The aim is to reduce the long term disability by physical and psychological rehabilitation of the injury and restoration of body function to the maximum extent possible (Gupta 2010).

Epidemiology of Accident

The epidemiology of occurrence of accident and injury and its severity primarily depends on the agent, the reservoir, vector, host response, environmental factor, and risk factor.

Agent: The agent is energy seen in a variety of different physical ways. Energy can be delivered in a way to cause blunt trauma to tissue or organs or it can be delivered in form of projectiles which produce penetrating injury. Energy may exist in the form of mechanical, electrical, chemical, radiation, and thermal force (Gupta 2010).

Reservoir: The reservoir is the place where the agent is usually found, e.g. generator/ power houses are the reservoir of man-made electricity. Petrol/diesel is the reservoir of energy converted by vehicle into kinetic energy.

Vector: Vectors are inanimate objects like motor vehicle, bullet, cigarette, flammable clothes, etc. that transfer the energy from its reservoir to potential or actual host. An exposure may or may not result in injury depending upon whether the amount of contact between a susceptible host and the energy involved is out of the bound of tissue tolerance. The issue of threshold or tolerance level of injury is important in understanding of injury from exposure to energy. A human being or animal can also exact mechanical energy, hence becoming an animate object or a vector of energy, e.g. the kick of a horse (Gupta, 2010).

Host Response: The human being has potential to increase their resistance to energy force, e.g. muscle strengthening by athletes, yet there are limits, beyond which energy delivered to the host cannot be absorbed or tolerated. The host response depends upon its age, medical condition, diets, physical condition etc. Males are twice as much as females of being victims of an accident. Young males are at maximum risk of injury while the case fatality following an injury is highest in the elderly.

Environmental Factors: Poor road condition, inadequate transport system, excessive heat and cold, poor illumination of road or work place, poor enforcement of law, lack of safety devices, easy availability of poisonous and hazardous substances, overpopulation , literacy, prevalence of tray animals on road are some of the environmental factors contributing to injuries.

Risk Factor: This is defined as a characteristic that have been epidemiologically demonstrated to be associated with a particular injury. Risk factors may be causative ("exposure to fluids' in burns) or contributory (driver fatigue). They may be modifiable (speed of a vehicle) or non-modifiable (age and sex of a victims) (Gupta, 2010).

Occupational Environments

Industrial workers constitute only a segment of the general population and the factors that influence the health of the workers are housing, water, waste deposal, nutrition, and education. In addition to these factors, the health of the industrial workers in a large measure will also be influenced by conditions prevailing in their working place. One of the aims of

occupational health is to safeguard the health of the workers and to step up industrial production (Park, 2009). Occupational environment is the sum of external conditions and influences which prevail at the place of work of which have a bearing on the health of the working population. The industrial workers today are placed in a highly complicated environment which is getting more complicated as man is becoming more indigenous.

Basically, there are three types of interactions in a working environment.

A. Man and physical, Chemical, Biological agents.
B. Man and machine.
C. Man and Man.

Man and Physical, Chemical, and Biological Agents

Physical Agent: The physical factors in working environment which may have adverse effects on health are heat, cold, humidity, air movement, heat radiation, light, noise, vibration and ionizing radiation. These factors act in different ways on the efficiency of the workers, singly or in different combinations. The amount of working and breathing space, toilet, washing and birthing facilities are also important factors in occupational environment (Park, 2009).

Chemical Agents: These comprise a large number of chemical, toxic dust and gases which are potentially hazardous to the health of the workers. Some chemical agents can cause disabling respiratory illness, some cause injury to skin and some may have a deleterious effect on the body and other organs of the body (Park, 2009).

Biological Agents: The workers may be exposed to viral, rickettsial, parasite, contaminated water, soil or food (Park, 2009).

Man and Machine: An industry or factory implies the use of machines driven by power with emphasis on mass production. The unguarded machines, protruding and moving parts, poor installation of the plant and lack of safety measures are the causes of accidents which is the major problems in industries. Working for long hours in unstable posture is among the causes of fatigue, backache, disease of joint, and muscles impairment of the workers' health and efficiency (Park, 2009).

Man and Man: There are numerous psychological factors which operate at the place of work. These are the human relationship amongst workers themselves on the one hand, and those in authority over them on the other. Example of psychological factors include the type and rhythm of work, work stability, service conditions, degree of responsibility, trade union activities, incentives, and host of other similar factors entering the field of human relationship. In modern occupational health, the emphasis is upon the people, the condition in which they live and work, their hopes and fears and their attitudes towards their job, their fellow workers and employers (Park, 2009).

The occupational environment cannot be considered apart from the domestic environment, both are complimentary to each other. The worker takes his worries home, and brings to his work disturbances which arise to his domestic environment. Just as stress at home may affect his work, severe prolonged stress no matter whether it has been aroused may produce physical and mental symptoms which do not allow man to work efficiently (Park, 2009). According to ecological approach, occupational health represents a dynamic equilibrium or adjustment between the industrial workers and occupational environment (Park, 2009).

Occupational Hazards: An industrial worker may be exposed to different types of hazards depending upon his occupation. These are:

A. Physical hazards
B. Chemical hazards
C. Biological hazards
D. Mechanical hazards
E. Psychosocial hazards

Physical Hazards: The common physical hazards in most industries is heat and cold. The direct effect of heat exposure are burn, heat exhaustion, heat stroke, heat cramps, in direct decrease deficiency, increase fatigue, and enhance accident rate. Many industries have local "hot spots" oven and funnels which radiate heat. Radiant heat is a main problem in foundry, glass industries and steel industries. While heat radiation is the principal problems in jute and cotton textile industry, high temperatures are also found in mines, for instance, important hazards associate with coal work (Aniefiok, 2005).

Mechanical Hazards: Mechanical hazards occur through appliances which present themselves in various forms in our working place. Examples are unguarded machines, pointed objects, unprotected electrical cables, shape apparatus, etc. Modern power driven tools vibrating a thousand of times are liable to produce stiffness of the fingers. Hand cramp and corns can occur in writers, painters, typists, and in rapid repetitive fine movement of the fingers (Aniefiok, 2005).

Psycho Social /Psychological Hazards: These are concerned with the agents that affect the wellbeing of the human inner statues that relate to psychotic and neurotic feelings. From findings and research, it is

known that a lot of work conditions are accompanied by psychological health hazards. Adverse psychological factors at work have been blamed for this psychomatic and behavioral disorder. Paramount among these are the potential stressors such as poor working condition, relationship at work with colleagues, superiors and subordinates. This occupational stress can result in psychological, behavioral, physiological and somatic problems. These include headaches, fatigues, dizziness, tension, anxiety, depression, drug use and a host of other ailments such as asthma, thyroid disorder, arthritis, hypertension and ulcer (Aniefiok, 2005).

Chemical Hazard: Chemical hazards may come in the form of vapour, gases, fumes, dust, and mist. Modern industries are exposed to the use of an infinite number of chemical substances and compounds, some of which are injurious to health. More than five hundred of such materials have been recognized and coming into contact with these materials can lead to poisoning. The major industrial poisons include lead and certain other heavy metals, carbon monoxide, pesticide and miscellaneous coal-tar derivatives. Some exist in form of gases, vapour, dust, fumes and are more dangerous and difficult to control. Hyperbarism is a condition resulting from exposure to gas pressures within the body. It is common among drivers and construction workers in water tunnels (Aniefiok, 2005).

Biological Hazards: These occur from biological agents which include bacteria, fungi, viruses and parasites with which workers come in contact in the course of work. There are many potential sources of infection involving deferent pathogens. However, the hepatitis B, and Human Immunodeficiency Virus (HIV) are important biological hazards to those working in the health sectors. Also very common is tuberculosis from human contact and veterinary health bays. Meanwhile a lot of acceptable guidelines have been formulated for the control of the infectious agents (Aniefiok, 2005).

Occupational Accident and Injury: In most cases, these are end product of dampness. Many people are employed in places which are exceedingly damp, e.g. fishing industries, leather industries, potteries, paper industries, and agricultural sector. It is important to note that injuries sustained in any of these industries render an employee susceptible to others (Aniefiok, 2005).

Classification of Accidents and Injuries

Accidents can be classified in various ways such as:

A. Classification based on the magnitude of danger of life and property

These can subdivided in to the following categories.

a. Minor
b. Moderate
c. Major
d. Disaster.

Minor –where there is no loss of life.

Moderate –where there is injury but no loss of life and property.

Major: where there is loss of life.

Disaster: where there is extreme loss of property and life.

B. Classification based on the principal cause and effects

This can be sub-divided into several categories

a. Fire and explosion.
b. Electrical accidents.
c. Shock and flashovers.
d. Fire and explosion initiated by spark and short circuit current.
e. Failure and accident in electrical plant.

C. Chemical accident and explosion

a. Emission of gases, fumes dust, chemical fluids.
b. Nuclear disaster, radiation of radioactive rays.

D. Accident with machine, plant and tools

a. Due to failure of accessory.
b. Due to error.
c. Due to process hazards (e.g. eye injury due to laser, welding – light.

E. Falling object on the body

a. During contraction work.
b. During operation of plant (e.g. while shifting by crane.

F. Falling of persons in pit or from height.

G. Accident from civil work (buildings, bridges, construction work.

a. During on striation work.
b. During service life of plant.

H. Human made accident, sabotage, thefts of critical parts.

I. Natural disaster floods, lighting, landsides earthquake, volcano (Jain, 2008).

Intentional injuries are subdivided in to:

1. Self-inflicted injuries, i e., suicide interpersonal violence (e.g. homicide).
2. War related injuries and other international injuries (includes injury due to legal intervention (Gupta, 2010).

Unintentional injury includes road traffic accident, burns, falls, poisoning etc. Other unintentional

injuries includes exposure to animate and inanimate mechanical force such as electrical current, radiation, extreme ambient temperature and pressure, venomous plant and animal (Gupta,2010).

Causes of Industrial Accident and Injury

According to Jain (2009) and Osanyinbemi (1987), there are factors that cause or create accidents in a working environment which depends largely on the industry that one is working in as to what some of the causes of industrial accidents are. Falling from high places is one of the lead causes of industrial accident.

Unsafe Act is an action which is carried out by a person without due regard for the safety of himself or others. It is also caused by errors due to human elements which include improper attitude, lack of knowledge or skill, physical or mental imbalance, using unsafe equipment and working on moving machinery. Intelligence, age, experience and state of healthcare personal factors which are responsible for those human elements (Osanyinbemi, 1987).

Unsafe Condition: This is any existing condition which may cause accident for instance, oil spillage on the floor, open pit, unguarded belt or gears, poor ventilation, high or low temperature and noise. Unsafe condition may be physical or human; it may also be internal or external to the plant (Jain, 2009).

Prevention and Control of Industrial Accident

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The steps toward accident prevention are as follows:

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2. **Safe Person:** That is the proper use of safely devices by the worker, care, vulnerability, personal hygiene etc.

B. **Post-Accident Strategy:** This refers to step or action taken after accident has been happening to help the management to know the causes and the sources of accident e.g. investigation and finding the causes of accident. The cause may be due to mechanical fault, poor supervision and training.

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Injury Prevention

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Primordial and Primary Prevention: Efforts are directed at removing the circumstances leading to injuries. The usual strategies would consist of IEC activities on prevention of injury geared to protect from injuries

Secondary Prevention: Immediate care is needed once an injury occurred. Immediate resuscitation, first aid, triage and quick referral, and early hospital care are cornerstone of secondary prevention. This is aimed at reducing the severity and complication of injury as well as to prevent death.

Tertiary Prevention: The aimed is to reduce the long term disability by physical and psychological rehabilitation of the injury and restoration of body function to the maximum extent possible (Gupta 2010).

Lipkus, et al, (2015) examined the increase of colorectal cancer among individual in the carpentry. They analyzed 2 x 2 factorial design intervention study varied two dimensions of providing CRC risk factor information: (1) type of risk factor-one set of interventions emphasized three basic risk factors (age, family history and polyps); the other set emphasized a comprehensive set of risk factors including basic, lifestyle, and occupational factors, and (2) tailoring/not tailoring risk factor information. Participants were provided FOBTs. Outcomes were the proportion of returned FOBTs. The result showed that varying the amount and intensity of delivering CRC risk factors information affected neither risk perceptions nor initial, yearly, or repeat screening. However, yearly and repeat screening rates were greater among participants who received interventions addressing comprehensive set of risk factors, especially with increasing age. They concluded that tailoring on several CRC risk factors appears insufficient to increase and sustain elevated perceptions of CRC risks to promote screening.

Dong and Platner (2016) examine the fatalities among Hispanic construction workers from 2000 – 2016. They analyzed the data from the Census of Fatal Occupational Injuries (CFOI) and current population surveys (CPS) were examined from 2000 - 2016.

Fatality rate, relative risk (RR), and risk index were calculated using CFOI fatality data and CPS data on hours worked, adjusted to full-time-equivalents (FTE). Data between 2000 and 2016 were combined to allow reliable comparisons of age and occupational groups. RR and 95% confidence intervals were calculated. The result showed that in 2016, Hispanics constituted less than 16% of the construction workforce yet suffered 23.5% of fatal injuries. RRs were: helpers, construction trades, 2.31 (95% CI: 1.41-3.80); roofers 1.77 (95% CI: 1.38-2.28); carpenters 1.39 (95% CI: 1.08-1.79); and construction labourers 1.31 (95% CI: 1.17-1.46). They concluded that Hispanic construction workers consistently faced higher RRs, for every year from 2000 - 2016 and for every age group. In 2016, Hispanic construction workers were nearly twice (1.84, 95% CI: 1.60-2.10) as likely to be killed by occupational injuries as their non-Hispanic counterparts.

Halperin and McCann, (2015) examined the common scaffold safety in construction site, they examine among 150-point checklist was used to evaluate supported scaffold safety practices at 113 scaffolds in nine areas of the Eastern United States. The result showed that thirty-six scaffolds (31.9%) were either in danger of collapse or missing planking, guardrails, or adequate access. There was a strong statistical correlation between structural flaws and fall protection hazards, and between proper scaffold safety practice and (a) competent persons with scaffold safety training, (b) use of separate scaffold erection contractors, and (c) scaffolds that were not simple frame types. A slightly weaker correlation was found with union status of the scaffold erector, and no correlation was found with geography, site size, number of scaffold users, and trade working on the scaffold. They recommended that safer scaffold practice, including a simple four-factor scaffold inspection method.

Darragh, et al., (2016) examined the effectiveness of home safe among residential construction workers. They analyzed the overall and severe injury incidence rates declined during the intervention period. Data were analyzed using incidence rates and Poisson regression to control for the effect of antecedent secular trend. The result showed that Injury incidence rates declined significantly following Home Safe; however, this effect was not statistically significant once temporal variation was controlled. They concluded that the decline in injury rates following Home Safe cannot be attributed solely to Home Safe, however, programmatic and methodological limitations contributed to the inconclusive results. Further research into the hazards faced by residential construction workers is needed.

Kittusamy and Buchholz, (2016) examined the whole-body vibration and postural-stress among operators of construction equipment. They analyzed selected papers that have studied exposure to whole-body vibration and awkward posture among operators of mobile equipment. The result showed that there have been only few studies that have specifically examined exposure of these risk factors among operators of construction equipment. Thus other studies from related industry and equipment were reviewed as applicable. They concluded that in order to better understand whole-body vibration and postural stress among OEs, it is recommended that future studies are needed in evaluating these risk factors among OEs.

Okun, et al (2015) examined the trends in occupational lead exposure. They analyzed lead exposure measurements collected by the Occupational Safety and Health Administration (OSHA) under their compliance and consultation programs were analyzed. Time trends in the distributions of exposure levels were evaluated graphically. Trends in the proportion of exposures above the OSHA permissible exposure limit (PEL) were analyzed using logistic regression models. The result showed that the distribution of lead exposure levels declined over the study time period for general industry, but not for construction. The median exposure levels for general industry facilities decreased five- to ten folds. Logistic regression models revealed statistically significant declines in the odds of lead exposure exceeding the PEL. They concluded that the study provides evidence for relatively large decreases in lead exposure levels in general industry facilities over time. The study does not provide similar evidence for the construction industry. Given the limited number of years of data available since the implementation of the revised construction standard for lead, re-analysis of lead exposure levels within this industry would be worthwhile when more data become available.

Goldenhar, et al (2013) examined existing relationship between working overtime and possible adverse health and safety outcomes for construction workers. Five focus-group discussions were conducted with construction workers from around the United States. From the analyzed transcripts, a model of overtime was developed. The result showed that the model includes three dominant themes: (1) work organization issues [(a) definitions of overtime, (b) scheduling, and (c) economic conditions], (2) why workers choose to work overtime (a) management expectations, (b) career, and (c) money], and (3) the effects of working overtime [(a) health and safety, including sleep deprivation, injury, fatigue, and stress,

and (b) productivity]. They concluded that Health and safety is only one of the adverse outcomes related to working too much overtime. A list of worker-inspired recommendations for addressing overtime issues is provided.

Dement, et al., (2017) made a surveillance of respiratory disease among construction workers. They analyzed workers by providing a detailed work and exposure history and underwent a respiratory examination, which included a respiratory history and symptom questionnaire, a posterior-anterior (P-A) chest radiograph, and spirometry. Both stratified and multivariate logistic regression analyses were used to explore the risk of disease by duration of DOE employment and frequency of exposure, while controlling for potential confounders such as age, race, sex, and other work in the construction and building trades. The result showed that among the 2,602 workers, 25.2% showed one or more chest X-ray changes by ILO criteria and 42.7% demonstrated one or more pulmonary function defects. The overall prevalence of parenchymal changes by ILO criteria (profusion 1/0 or greater) was 5.4%. In the logistic regression models, the odds ratio for parenchymal disease was 2.6 (95% confidence interval (CI) = 1.0-6.6) for workers employed 6 to 20 years at Hanford or Savannah River and increased to 3.6 (95% CI = 1.1-11.6) for workers employed more than 35 years, with additional incremental risks for workers reporting routine exposures to asbestos or silica. They concluded that continued surveillance of workers is important given their increased risk of disease progression and their risk for asbestos related malignancies. Smoking cessation programs should also be of high priority and continued abstinence for former smokers reinforced. Although, the observed respiratory disease patterns are largely reflective of past exposures, these findings suggest that DOE needs to continue to review industrial hygiene control programs for work tasks involving maintenance, repair, renovation, and demolition.

McCann, et al., (2014) examined the causes of electrical death and injury among construction workers. They analyzed two sources of data in detail: (1) 1,019 electrical deaths identified by the Bureau of Labor Statistics, Census of Fatal Occupational Injuries (CFOI) for the years 2005-2010; and (2) 61 electrical injuries identified between November 1, 2005 and December 31, 2010 from a George Washington University Emergency Department injury surveillance database. The results showed that contact with "live" electrical wiring, equipment, and light fixtures was the main cause of electrical deaths and injuries among electrical workers, followed by contact with overhead power lines. Among non-electrical workers, contact with overhead power lines was the major cause of death. Other causes included contact with energized metal objects, machinery, power tools, and portable lights. Arc flash or blast caused 31% of electrical injuries among construction workers, but less than 2% of electrical death. They concluded that adoption of a lockout/tagout standard for construction, and training for non-electrical workers in basic electrical safety would reduce the risk of electrical deaths and injuries in construction. Further research is needed on ways to prevent electrical deaths and injuries while working "live".

McCann (2014) examined deaths of construction workers due to personnel lift. He analyzed 2005 - 2010 data from the Census of Fatal Occupational Injuries, a Bureau of Labor Statistics database. The result identified 339 deaths: 42% from boom-supported lifts; 26% from suspended scaffolds; 19% from scissor lifts; 5% from crane platforms; and 7% from unapproved lifts (e.g., forklift platforms). The main causes of death were: falls (36%), collapses/tipovers (29%), and electrocutions (21%). He recommended following OSHA regulations, wearing personal fall protection equipment, adequate maintenance, inspection before use, and training on the model of lift used. Precautions are also needed to prevent contact with overhead power line.

Welch, et al., (2016) examined beryllium disease among construction workers he analyzed through medical history and a beryllium blood lymphocyte proliferation test (BeLPT). Stratified and multivariate logistic regression analyses were used to explore the risk of disease by age, race, sex, trade, duration of DOE employment, reported work in buildings where beryllium was used, and time since last DOE site employment. The result showed that out of 3,842 workers included in this study, 34% reported exposure to beryllium. Overall, 2.2% of workers had at least one abnormal BeLPT test, and 1.4% were also abnormal on a second test. Regression analyses demonstrated increased risk of having at least one abnormal BeLPT to be associated with ever working in a site building where beryllium activities had taken place. They concluded that the prevalence of beryllium sensitivity and chronic beryllium disease (CBD) in construction workers is described and the positive predictive value of the BeLPT in a population with less intense exposure to beryllium than other populations that have been screened is discussed. The BeLPT findings and finding of cases of CBD demonstrate that some of these workers had significant exposure, most likely, during maintenance, repair, renovation, or demolition in facilities where beryllium was used.

Dong, et al., (2015) examined trends and patterns of fatal falls from roofs in the U.S. construction industry over an 18-year period (2005-2013), with detailed analysis. They analyzed the U.S. Bureau of Labor Statistics' Census of Fatal Occupational Injuries and the Current Population Survey. The results showed that roof fatalities accounted for one-third of fatal falls in construction in 2005-2013. A disproportionately high percentage (67%) of deaths from roof falls occurred in small construction establishments (1-10 employees). Roofers, iron workers, workers employed with roofing contractors, or working at residential construction sites, had a higher risk of roof fatalities. A higher rate of roof fatalities was also found among younger (<20years) and older (44years) workers, Hispanics, and immigrant workers. They concluded that roof fatalities corresponded with economic cycles and differed among construction subgroups and worksites. Impact on Industry: Prevention strategies should target high-risk worker groups and small establishments.

Aton, et al., (2013) examined the effect of lift teams on kinematics and muscle activity of the upper extremity and trunk in brick layers. They analyzed eighteen apprentice brick layers who constructed walls with concrete blocks alone (1 person) and in 2-person lift teams. Peak shoulder and trunk kinematics and normalized mean surface electromyography of the upper trapezius, lumbar paraspinals, and flexor fore-arm muscles were collected bilaterally. Differences between construction methods and rows 1, 3, and 6 of the wall were calculated with repeated-measures analyses of variance. The result showed that lift teams required less trunk flexion ($P = .008$) at row 1 but more side bending at row 6 ($P<.001$) than working alone. Dominant-side lumbar paraspinal activity was lower at row 3 ($P = .008$) among lift-team workers. Lift-team peak shoulder flexion was lower at row 3 ($P = .002$), whereas abduction was higher at rows 1 ($P = .007$) and 6 ($P<.001$). Concomitantly, non-dominant upper trapezius activity and flexor forearm activity were significantly higher for lift teams at row 6 ($P<.001$ and $P = .007$). Block moment arm was significantly greater for lift teams at all rows ($P\leq.002$). They concluded that working in lift teams may be a beneficial intervention for reducing trunk flexion and lumbar paraspinal activity when brick layers work at heights between the knees and waist, but lift teams are not recommended at higher working heights.

Dong, et al., (2012) examined the longitudinal study ofchronic back pain among older construction workers in the United States. They analyzed data from the 1992-2008 Health and Retirement Study (HRS), a large-scale longitudinal survey. Fixed effects methods were applied in the multiple logistic regression model to explore the association between back pain and time-varying factors (e.g., employment, job characteristics, general health status) while controlling for stable variables (e.g., gender, race, ethnicity). The results showed that about 40% of older construction workers over the age of 50 suffered from persistent back pain or problems. Jobs involving a great deal of stress or physical effort significantly increased the risk of back disorders and longest-held jobs in construction increased the odds of back disorders by 32% (95% CI: 1·04-1·67). Furthermore, poor physical and mental health was wrongly correlated with back problems. He concluded that enhanced interventions for construction workers are urgently needed given the aging workforce and high prevalence of back disorders in this industry.

Ochsner, et al., (2016) examined latino day laborers who often worked at dangerous construction sites with little power to change conditions. They described the development, implementation, and early-stage results of a program to train immigrant day laborers as safety liaisons. These are construction workers prepared to recognize and respond to health and safety hazards. Based in Newark, NJ, the project involves collaboration between New Labor, a membership-based worker center, and university researchers and labor educators. Safety liaisons undergo training and receive ongoing support for their roles. Both qualitative and quantitative data are collected to monitor progress. Although lacking in formal authority, safety liaisons have prompted improvements at specific sites, filed OSHA complaints, and developed a local worker council. Participatory training methods, opportunities for leadership outside the classroom, and participation in project planning have strengthened liaisons' effectiveness, leadership skills, and commitment. The safety liaison approach could be adapted by worker centers and their partner organizations.

Gentlemen, et al., (2015) examined a response to eight tragic deaths over an eighteen month times Spanish track construction project on the largest commercial development project in the U.S.A. The past four versions of a survey were distributed to workers, foremen, superintendents, and senior management. In addition to standard Likert-scale safety climate scale items, an open-ended item was included at the end of the survey. The result showed that safety climate perceptions differed by job level. Specifically, management perceived a more positive safety climate as compared to workers. Content analysis of the open-ended item was used to identify important safety and health concerns which might

have been overlooked with the qualitative portion of the survey. He concluded that the surveys were conducted to understand workforce issues of concern with the aim of improving site safety conditions. Such efforts can require minimal investment of resources and time and result in critical feedback for developing interventions affecting organizational structure, management processes, and communication.

Akbar, et al., (2018) examined the effectiveness of dust control method for crystalline silica and reparable suspended particulate matter exposure during manual concrete surface grinding. He discovered that concrete grinding exposes workers to unacceptable levels of crystalline silica dust, known to cause diseases such as silicosis and possibly lung cancer. They also examined the influence of major factors of exposure and effectiveness of existing dust control methods by simulating field concrete grinding in an enclosed workplace laboratory. Air was monitored during 201 concrete grinding sessions while using a variety of grinders, accessories, and existing dust control methods, including general ventilation (GV), local exhaust ventilation (LEV), and wet grinding. The result showed that no combination of factors or control methods reduced an 8-hr exposure level to below the recommended criterion of 0.025 mg/m³ for crystalline silica. They concluded that there is need for further refinement in engineering controls, administrative controls, or the use of respirators.

Welchi, et al., (2016) examined the impact of musculoskeletal and medical condition on disability retirement among construction roofers. They analyzed the participants about the presence of medical conditions and musculoskeletal disorders. The Work Limitations Questionnaire, the SF-12, and other validated assessments of social and economic impact of injury were included. The result showed that factors at baseline that predicted leaving for a health-related reason were older age, lower physical functioning, work limitations, and having missed work. Those who left roofing for a health-related reason were much more likely to have a lower economic score at the 1 year interview. They concluded that medical and musculoskeletal conditions are strongly associated with work limitation, missed work, and reduced physical functioning. These factors are also associated with premature departure from the workforce.

Dement, et al., (2016) examined the mortality of older construction and craft workers. A cohort of 8,976 former construction workers from Hanford, Savannah River, Oak Ridge, and Amchitka was followed using the National Death Index through December 31, 2008, to ascertain vital status and causes of death. Cause-Specific Standardized Mortality Ratios (SMRs) were calculated based on US death rates. The result showed that Six hundred and seventy-four deaths occurred in this cohort and overall mortality was slightly less than expected (SMR = 0.93, 95% CI = 0.86-1.01), indicating a "healthy worker effect." However, significantly excess mortality was observed for all cancers (SMR = 1.28, 95% CI = 1.13-1.45), lung cancer (SMR = 1.54, 95% CI = 1.24-1.87), mesothelioma (SMR = 5.93, 95% CI = 2.56-11.68), and asbestosis (SMR = 33.89, 95% CI = 18.03-57.95). Non-Hodgkin's lymphoma was in excess at Oak Ridge and multiple myeloma was in excess at Hanford. Chronic Obstructive Pulmonary Disease (COPD) was significantly elevated among workers at the Savannah River Site (SMR = 1.92, 95% CI = 1.02-3.29). They concluded that DOE construction workers at these four sites were found to have significantly excess risk for combined cancer sites included in the Department of Labour' Energy Employees Occupational Illness Compensation Program (EEOCIPA). Asbestos-related cancers were significantly elevated.

Dement, et al., (2016) examined the hazards among sheet metal inquiries. A cohort of 17,345 individuals with 20 or more years in the trade and who participated in the asbestos disease screening program were followed for vital status and causes of death between 2008 and 2016. Data from the screening program included chest X-ray results by International Labour Office (ILO) criteria and smoking history. Standardized mortality ratios (SMRs) by cause were generated using U.S. death rates and Cox proportional hazards models were used to investigate lung cancer risk relative to chest X-ray changes while controlling for smoking. The result showed that a significantly reduced SMR of 0.83 (95% CI = 0.80-0.85) was observed for all causes combined. Statistically significant excess mortality was observed for pleural cancers, mesothelioma, and asbestosis in the SMR analyses. Both lung cancer and COPD SMRs increased consistently and strongly with increasing ILO profusion score. In Cox models, which controlled for smoking, increased lung cancer was observed among workers with ILO scores of 0/1 (RR = 1.17, 95% CI = 0.89-1.54), with a strong trend for increasing lung cancer risk with increasing ILO profusion score >0/0. They concluded that Sheet metal workers are at increased risk for asbestos-related diseases. This study contributes to the literature demonstrating asbestos-related diseases among workers with largely indirect exposures and supports an increased lung cancer risk among workers with low ILO profusions.

Kaskutas, et al., (20016) examine the fall hazards on residual construction site. Trained carpenters were analyzed and administered the St. Louis Audit of Fall Risks and interviewed carpenters. The prevalence of fall prevention practices meeting safety criteria was counted and correlations explored. The result showed that there is high prevalence of fall hazards at the 197 residential sites audited. Roof sheathing met safety criteria most consistently (81%) and truss setting least consistently (28%). Use of personal fall arrest and monitoring of unguarded floor openings were rare. Safer performance on several scales was correlated. Construction sites of large-sized contractors were generally safer than smaller contractors. Apprentice carpenters were less familiar with their employers' fall prevention plan than experienced workers. They concluded that Safety could be improved with consistent use of recognized fall prevention practices at residential construction sites.

Dong, et al., (2015) examined work related injuries among Hispanic construction workers. Pooled data were analyzed from a large national population survey, the Medical Expenditure Panel Survey (MEPS), between 2005 and 2012. More than 7,000 construction workers were identified from the MEPS data including 1,833 Hispanic workers and 4,533 white, non-Hispanic workers. Univariate and multivariate analyses were conducted using SAS-callable SUDAAN. The result showed that Hispanic workers differ from white, non-Hispanic workers in demographic and socioeconomic status. After controlling for major risk factors, Hispanic construction workers were more likely than their white, non-Hispanic counterparts to suffer non-fatal work-related injury conditions (OR = 1.28, 95% CI: 1.00-1.64). They concluded that this study provides important evidence concerning Hispanic workers' safety on construction sites. Enhanced safety and health programs for Hispanic construction workers and improved occupational injury data systems are recommended.

Liscomb, (2016) examined the nail guns injury. Active surveillance data from 772 apprentice carpenters were used to document the injury risk associated with the use of nail guns and the potential impact of modifiable risk factors. They analyzed using reported work hours and nail gun injuries, injury rates per 200,000 hr worked in the past year were calculated. Using estimates of hours of tool use, Poisson regression was used to calculate adjusted rate ratios for injury associated with time in the trade, trigger mechanism on the tools and training prior to injury. The result showed that forty-five percent of these apprentices had sustained a nail gun injury; injury rates in the past year based on hours of work were considerably higher than previously recognized. Those with less than 1 year in the trade compared to those with more than 5 years experience (RR = 2.7; 95% CI 1.2, 5.9) and those with no training in tool use (RR = 2.9; 95% CI 1.9, 4.4) were at greatest risk. After adjusting for experience and training, the rate of injury was twice as high with tools with a contact trip trigger compared to those with a sequential trigger (RR = 2.0; 95% CI). They concluded that Preventive measures should include change to the safer sequential trigger that prevents unintentional firing and early training in safe tool use. Because of the high prevalence of use of tools with contact trip triggers, the greatest number of injuries among these apprentices could be prevented with an engineering solution.

Bang, et al., (2020) examined that a total of 7686 deaths between2010 - 2019 were attributed to respiratory TB. They analyzed the data using Proportionate mortality ratios (PMRs), adjusted for age, sex, and race were calculated from US census occupation and industry classifications. The result showed that Industries and occupations involving potential contact with infected cases (e.g., healthcare workers), those with silica exposure and silicosis (e.g., mining and construction), and those associated with low socioeconomic status had significantly elevated TB mortality. They concluded that in overall, the pattern of findings that are described in various prior reports, which indicate that the potential for exposure and disease development still persists among certain worker groups. The findings should be useful in guiding occupationally targeted TB prevention program.

McCann, (2014) examined contact with heavy equipment and truck related death on excavation work site. He analyzed the data from Bureau of Labor Statistics Census of Fatal Occupational Injuries, identified 253 heavy equipment related deaths on construction sites in the Excavation Work industry for the years 200-2010. The result showed that heavy equipment operators and construction laborers made up 63% of the heavy equipment- and truck-related deaths. Backhoes and trucks were involved in half the deaths. Rollovers were the main cause of death of heavy equipment operators. For workers on foot and maintenance workers, being struck by heavy equipment or trucks (especially while backing up for workers on foot), and being struck by equipment loads or parts were the major causes of death. He concluded that ensuring adequate rollover protective structures for heavy equipment, requiring fastening of seat belts, adoption of a lock-out/tagout standard, establishing restricted access zones around heavy equipment, and requiring spotters for workers who

must be near heavy equipment or trucks would reduce the risk of heavy equipment- and truck-related deaths in construction..

Hess, et al., (2018) examined the use of and barriers to H-block and high lift grouting. They analyzed two alternatives to lifting concrete masonry blocks onto vertical rebar. Peak and cumulative shoulder motions were evaluated, as well as adoption barriers: H-block cost and stakeholder perceptions. Results indicated that using the alternatives significantly decreased peak shoulder flexion ($p < 0.001$). A case study indicated that building cost was higher with H-block, but the difference was less than 2% of the total cost. Contractors and specifies reported important differences in perceptions, work norms, and material use and practices. For example, 48% of specifies reported that use of high lift grouting was the contractor's choice, while 28% of contractors thought it must be specified. They concluded that use of H-block or high-lift grouting should be considered as methods to reduce awkward upper extremity postures. Cost and stakeholders' other perceptions present barriers that are important considerations when developing diffusion strategies for these alternatives

Lipscomb, et al., (2013) examined the safety, incentive and reporting of work related injuries among union carpenters, they analyzed through anonymous survey of 1,020 carpenter apprentices in three union training programs to document prevalence of their exposure to such efforts. We explored associations between perceptions of the reporting of work-related injury and elements of these programs. The result showed that fifty-eight percent (58%; n = 592) reported some safety incentive or negative consequence of work-related injuries on their current jobsite. Reporting of work-related injuries was 50% less prevalent when workers were disciplined for injury experiences. Otherwise, we saw minimal evidence of association between injury reporting practices and safety incentive programs. However, considerable evidence of fear of reprisal for reporting injuries was revealed. Less than half (46.4%) reported that work-related injuries were reported in their current workplace all or most of the time; over 30% said they were almost never or rarely reported. They concluded that there are multiple layers of disincentives to the reporting of work-related injuries that hamper understanding of risk and pose threats to workplace safety and productivity. These pressures do not arise in a vacuum and are likely influenced by a host of contextual factors. Efforts that help us understand variation across jobsites and time could be enlightening; such inquiries may require mixed methodologies and should be framed with consideration for the upper tiers of the public health hierarchy of hazard control.

Shishlov, (2018) studied the non-fatal construction fall related injuries. Data from the National Electronic Injury Surveillance System occupational supplement (NEISS-Work) were used to describe fall-related injuries treated in US emergency departments among workers in the construction industry (2009-2017). These data do not require workers' compensation as the payer in order to be classified as work-related. The result showed that based on NEISS-Work estimates, a total of 555,700 (95% confidence interval (CI): 390,700-720,800) non-fatal work-related injuries among workers in the construction industry were the result of a fall, resulting in an annual rate of 70 (95% CI: 49-91) per 10,000 full-time equivalents. Younger workers had higher rates of falls, whereas older workers were more likely to suffer serious injuries. The majority of the injuries (70%) were precipitated by falls to a lower level from roofs, ladders, and scaffolding. They concluded that the patterns of fall-related injuries identified in these data are consistent with other reports. In contrast to the declining rates of falls requiring days away from work reported through the Bureau of Labour Statistics Survey of Occupational Injuries andIllnesses, construction industry fall-related injury rates estimated through NEISS-Work remained unchanged from 1998 to 2005 providing another perspective on this serious cause of morbidity in the construction industry.

Lipscomb, (2013) Examined non-fatal contact related injuries among workers in the construction site. They analyzed work-related contact injuries in the construction industry that were treated in emergency departments (EDs) between 2003 and 2011 utilized records of work injuries captured through a national probability-based sample of U.S. hospitals with 24-hour ED services. The result showed that contact injuries accounted for 54% of all construction ED-treated injuries. Hospitalizations were most common for injuries from contact with discharged nails from pneumatic nail guns, with hand held power saws, and fixed saws. Some injuries were proportionally more serious and sometimes involved multiple workers including trenching injuries and those resulting from collapse of buildings under construction, walls, roofs, and scaffolding. Given that nail gun use is limited primarily to wood frame construction, efforts are needed to control frequent serious injuries associated with these tools. Enforcement of existing trenching regulations is also needed.

Jorgensen, et al., (2017) examined safety climate scale for construction workers. They analyzed

construction workers in two unions. A seventh item was developed midway through the study and incorporated into the version completed by half of the respondents. For one union with a sizeable number of Spanish-speaking members, a dual-language (Spanish/English) version was administered. Follow-up telephone interviews conducted 3 months after the self-completed survey also included the safety climate scale. The result showed that Cronbach's coefficient alpha was 0.85 for the 6-item scale and 0.85 for the 7-item scale. Similar coefficient alpha scores were found for the subgroup of Spanish-speakers on the 6- and 7-item scales. Spanish speakers with low education were less likely to respond to the scale when self-completing but not when it was administered by telephone in Spanish. They concluded that safety climate scale elicits consistent and reliable response from unionized construction workers when administered in English or in Spanish. Spanish literacy may be a consideration for the use of this scale among foreign-born Hispanic workers.

Runyan, et al., (2016) examined work hazards and workplace safety violation among adolescent construction workers by across sectional telephone survey in North Carolina during summer 2010. They analyzed adolescents (age <18 years) with work permit for the construction industry confront a lot of hazards because of the types of jobs, work tasks, supervisory conditions, tools equipment and processes a cross-sectional telephone survey. The result showed that a total of 187 survey respondents were in this study. Adolescents were employed in varied construction settings and business types. Nineteen of the 187 permitted workers were younger than 16 years, despite prohibitions against their employment in construction unless working for their parents. The remainder (n = 168) were working legally based on age, but most performed prohibited tasks. In fact, 84% of all the 16- to 17-year-olds had performed at least 1 clearly prohibited task and 47% had performed 3 or more. Although most reported being supervised and working with others, approximately 19% of all respondents reported working where they were not in hearing distance of other workers. Data were collected from teenagers with work permits, suggesting that these adolescents may work for more responsible employers. If violations of child labor laws exist in this group, it is likely that adolescents without permits are exposed to even greater hazards and violations. They concluded that involvement of teenagers in dangerous and/or prohibited tasks is a cause for concern and suggests a pressing need to examine the enforcement of existing laws and the need for additional protection.

Glazner, et al., (2015) examined factors contributing to construction injury. They analyzed over 4,000 injury reports, including text describing injury events, with an administrative workers' compensation (WC) database, and, using Haddon's matrix as a framework, classified factors contributing to injury during construction of Denver International Airport (DIA). The result showed that patterns of contributing factors varied according to injury mechanism and type of work: environmental factors contributed more than any other factor to slip/trip injuries, and building materials contributed to more than 40% of injuries to workers in carpentry, concrete construction, glass installation, and roofing. Rates at which factors contributed to injury also varied among types of work: environmental factors contributed at relatively high rates to injuries in glass installation, metal/steel installation and iron/steel erection >or= 2 stories and victim factors contributed at high rates to conduit construction and metal/steel installation injuries. They concluded that approach allows systematic analysis of classes of injuries, contributing factors, types of work, and other variables to assist in setting prevention priorities.

Forts, et al., (2013) examined training and community participatory research to reduce injury among construction workers. They analyzed that workplace mortality and severe injury Investigators partnered with eight WCs in seven cities to train worker leaders to deliver a modified OSHA 10-hr curriculum to their peers. The result showed that about thirty-two worker leaders trained 446 workers over 3 Years. There was a demonstrated improvement in knowledge, hazard identification, self-efficacy, and sustainable H&S activities. They concluded that this study provides evidence for successful implementation of a training intervention for low wage, low literacy Hispanic construction workers using a community-based participatory research approach.

Liu, et al., (2016) examined the effectiveness of Pennsylvania's voluntary program that provides workers' compensation premium discount to employers that establish joint labor-management safety committees. The result showed that committees are responsible for implementing several injury and illness prevention program elements: hazard identification, workplace inspection and safety management. They concluded that among program participants there was a strong association between improved injury and illness experience and the level of compliance with the program requirements. This is further evidence that programs with strong management commitment and active worker participation are effective in reducing injury risk,

while "paper" programs are, not surprisingly, ineffective.

MATERIALS AND METHOD

Study Design

The research is a cross sectional descriptive study at Haddock Quest Engineering and Construction Company which is geared towards investigating the workers' attitude towards accident prevention and control.

Area of Study

The area of study of this research work is the construction site of Haddock Quest Engineering and Construction Limited at Permanent Site, School of Nursing and Midwifery, Madobi Local Government Area, Kano State, Nigeria, which is bounded by four local governments. In the East, it is bounded by Gwale Local Government, from the North, bounded by Riming Gado Local Government Area, from the West, it is bounded by Kabo Local Government Area and in the South, it is bounded by Kiru Local Government Area.

Study Population

The population of study involved all the workers at Haddock Quest Engineering and Construction Company, both male and female from the age of 16 years and above.

Inclusion Criteria

All the workers male and female, 16 years and above.

Exclusion Criteria

1. Those who will not give a written consent to be part of the study.
2. Those who have severe systematic health problems that will make it difficult for them to properly fill out the questionnaire.

Sampling Size and Sampling Technique

Sampling Size

The sampling size is 120 people, which were selected to ascertain the probability of success and failure.

Sampling Technique

Simple Random Sampling technique was adopted in which the workers would be made to pick ballots and those who were successful will be used for the study.

Instruments for Data Collection

The questionnaire was given to the workers which they filled and returned for analysis.

Validity of Instrument

The study Questionnaire was carefully prepared by the researcher and was approved by the researcher's supervisor after few corrections for validity.

Reliability of Instrument

The questionnaire was initially administered to subject in a similar study population and the process was repeated one week later and the result were scaled and compared for consistency test via Alpha test.

Method of Data Collection

The questionnaire was administered after an inform consent was obtained. The literate respondents were allowed to fill the questionnaire themselves.

Method of Data Analysis

The SPSS version 17 was used to obtain the descriptive statistics of the study such as the mean, median, standard deviation, variance, standard error mean, etc. The Microsoft excel was used to create bar chart and graph for the presentation of data.

Ethical Consideration

An ethical consent was obtained from the ethical committee of the Department of Public Health, Federal University of Technology, Owerri.

RESULT AND DISCUSSION

Results

Results obtained in this research are presented in Tables and expressed graphically in Figures as follows:

Table 4.1: Age Distribution of subjects

Age group	F	%
16-20	25	20.8
21-25	29	24.2
26-30	27	22.6
31-35	20	16.6
36-40	12	10.0
Above 40	7.8	5.8
TOTAL	120	100

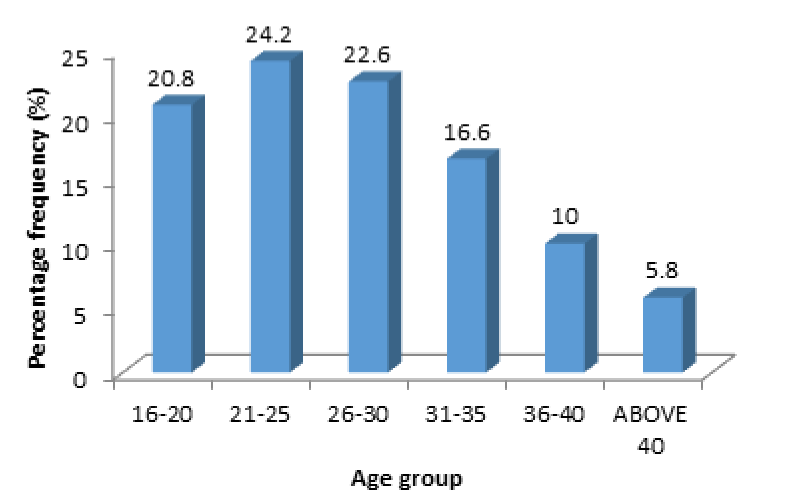

Figure 4.1: Frequency distribution of subjects

It could be seen from Table 4.1 and Figure 4.1 that majority of the workforce are those aged from 16 to 35 years, with those of them in the age bracket of 21 to 25 years dominating. This shows that strength is highly required for this kind of work.

Age group	Male F	%	Female f	%
16-20	15	12.5	10	8.3
21-25	20	16.7	9	7.5
26-30	17	14.3	10	8.3
31-35	13	10.8	7	5.8
36-40	6	5	6	5
ABOVE 40	4	3.3	3	2.5
TOTAL	75	62.6	45	37.4

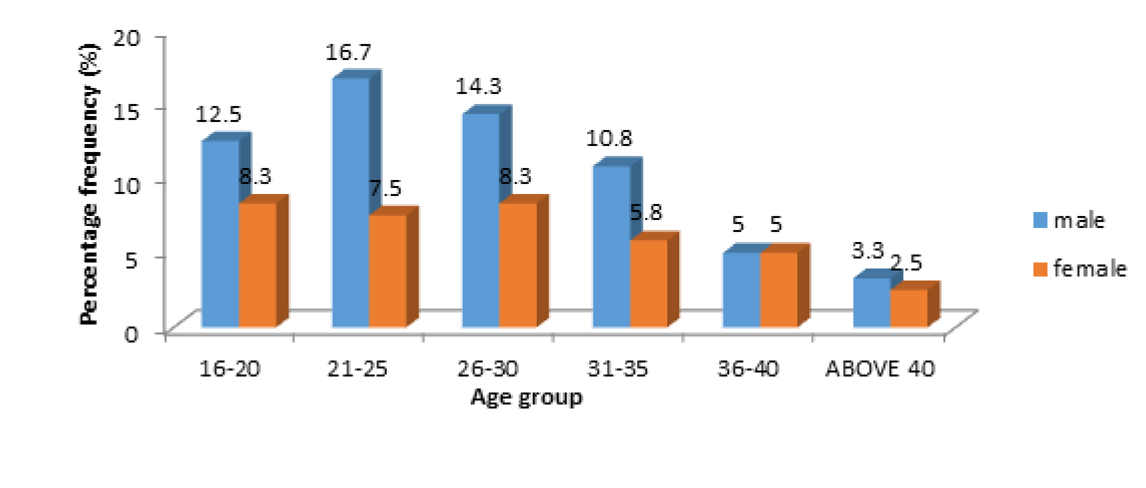

Figure 4.2: Frequency distribution of subjects according to age and gender

It can be observed from Table 4.2 and Figure 4.2 that more men are engaged in construction work than women probably because the men folk are physically stronger than the women folk. Also, for both male and female workers involved, the dominant age bracket is 16 to 35 years indicative of the fact that construction work requires strength.

Table 4.3: Statistical Values of Age of subjects

Gender	Min value	Max value	Range	Mean	Standard error mean	Standard deviation	Variance
Males	16	53	37	29.89	1.037	8.296	68.829
Females	16	43	27	30.96	0.786	5.724	32.768
Males + Females	16	53	42	30.73	0.767	8.404	70.621

Table 4.4: Frequency Distribution of subjects according to Marital Status

marital status	Frequency	%
Single	38	31.7
Married	44	36.7
Divorced	10	8.3
Widow/widower	16	13.3
Separated	12	10

Table 4.5: Distribution of Subject According to Educational Status

Educational status	Frequency %	%
Primary	38 31.6	31.6
Secondary	41 34.2	34.2
Vocational	18 15	15
Tertiary	23 19.2	19.2

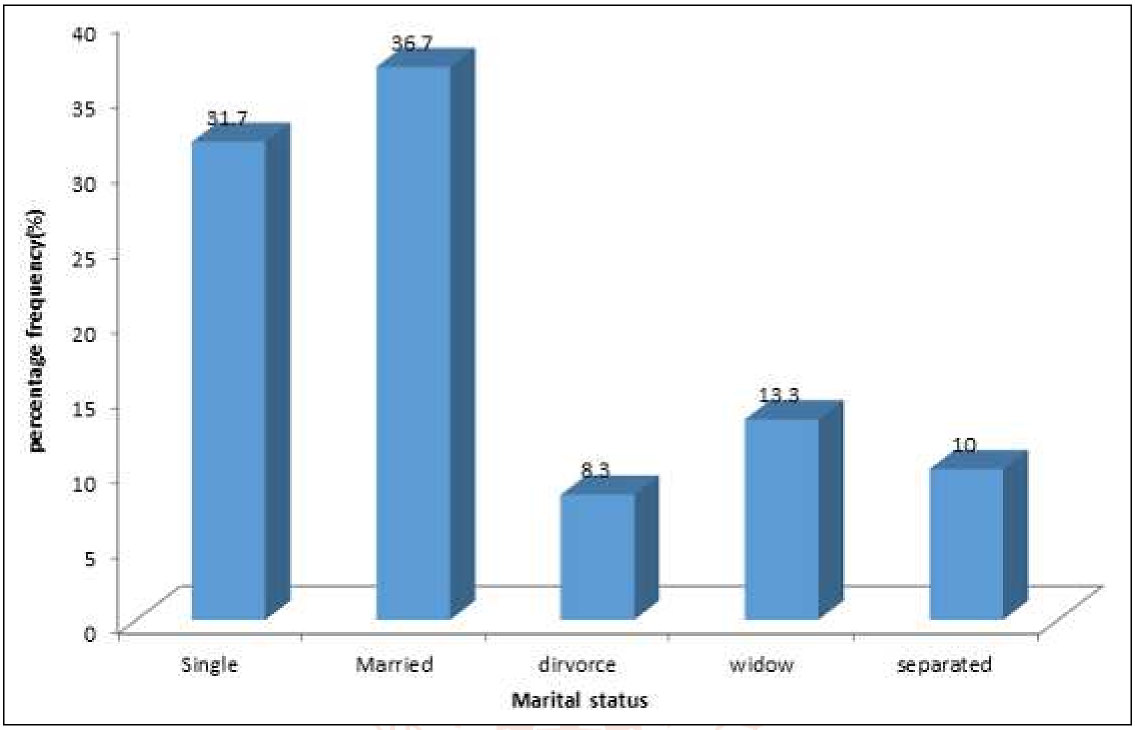

Figure 4.3: Frequency distribution of subjects according to Marital Status.

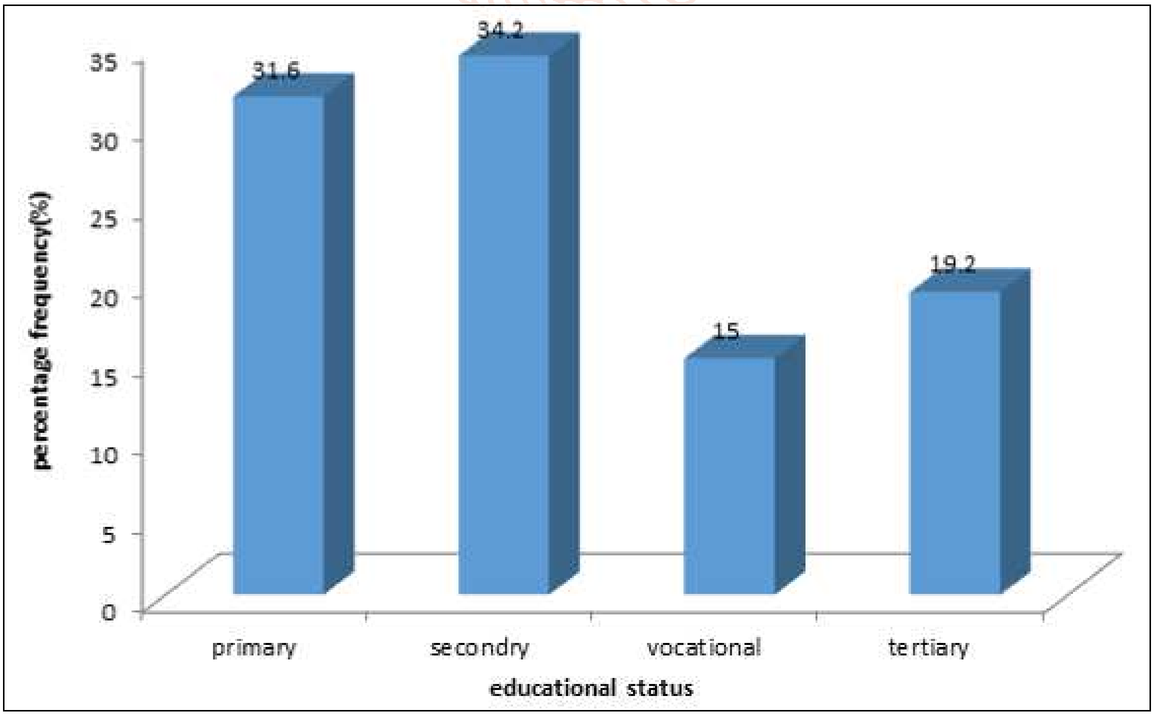

Figure 4.4: Distribution of Subjects According to Educational Status.

Table 4.4 and Figure 4.3 show that according to marital status, majority of the workers (36.7%) are married followed by the single (31.7%). The divorced, widows and separated are in the minority.

Also, Table 4.5 and Figure 4.4 show that those in the secondary and primary education engage most in construction work than those in vocational and tertiary education. This could be a pointer to the fact that those in tertiary and vocational institutions are more engaged academically.

Table 4.6: Distribution of subject according to Years of Experience

Years of Experience	Frequency	%
0-5	61	50.8
6-10	41	34.2
ABOVE 10	18	15

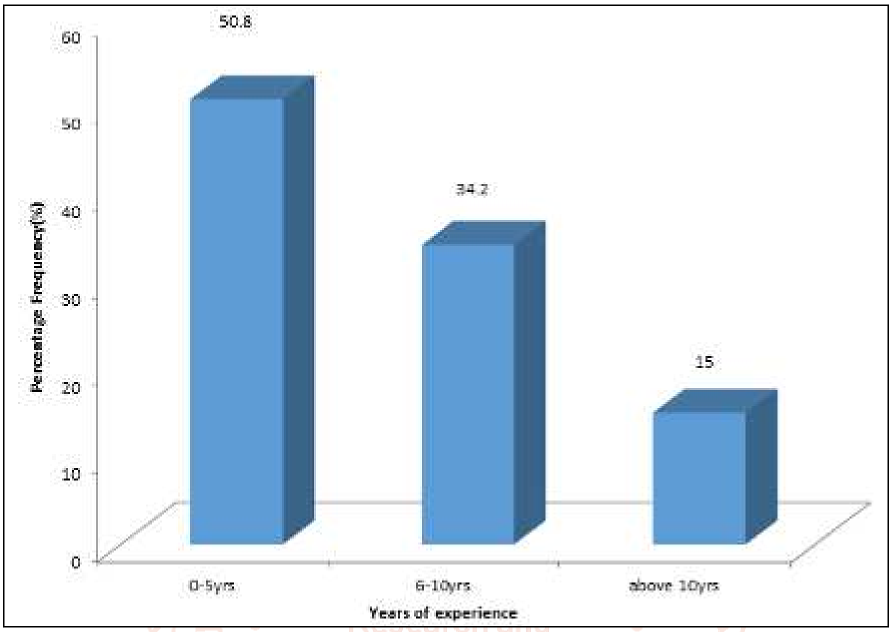

Figure 4.5: Distribution of Subjects According to Year of Experience

Based on years of experience (Table 4.6 and Figure 4.5), it could be observed that the beginners (0-5 years) who are more zealous to learn and work dominate the profession followed by those with 6 to 10 years of experience. Above 10 years of experience, there is a decline in engagement probably because of advancement in age.

Table 4.7: Workers knowledge on Accident and Injury Prevention Measures

Workers response	Frequency	%
Yes	67	55.8
No	53	

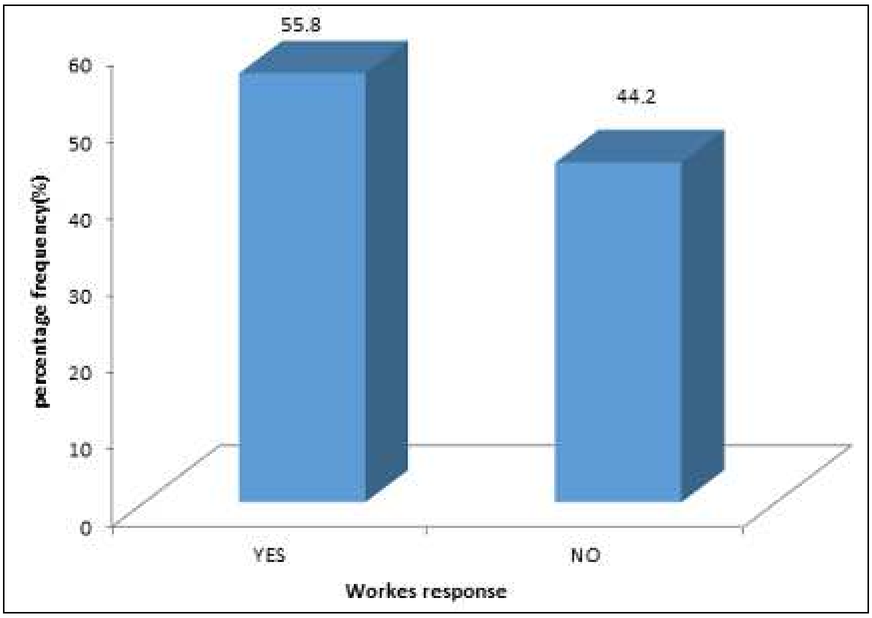

Figure 4.6: Workers' knowledge on accident and injury prevention measures

On workers' knowledge of accident and injury prevention measures (Table 4.7 and Figure 4.6), it is obvious that a good number of the workers (44.2%) do not have appropriate knowledge of accident and injury prevention measures. This could be responsible for the high incidence of accidents in construction companies.

Table 4.8: Workers response about Implication of Accident and Injury

WORKERS RESPONSE	FREQUENCY	%
YES	53	44.2
NO	67	55.8

Table 4.9: Workers response on Health Education Programme received

Workers Response	Frequency	%
YES	54	45
NO	66	55

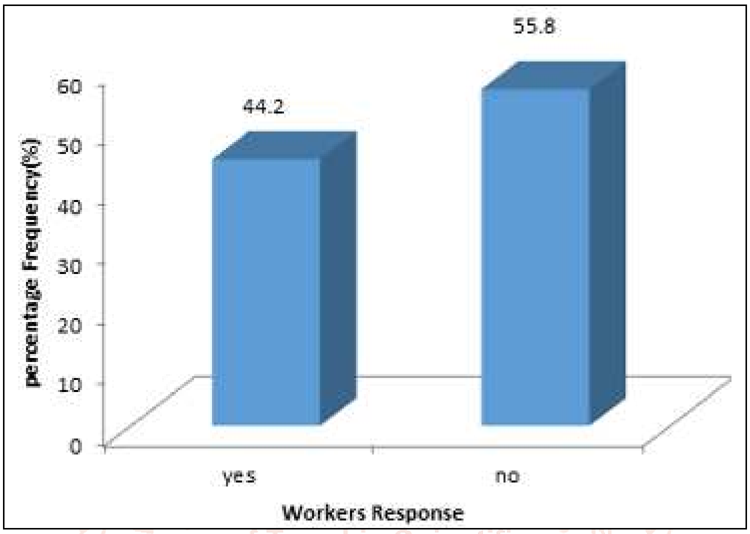

Figure 4.7: Workers knowledge about implication of accident and injury.

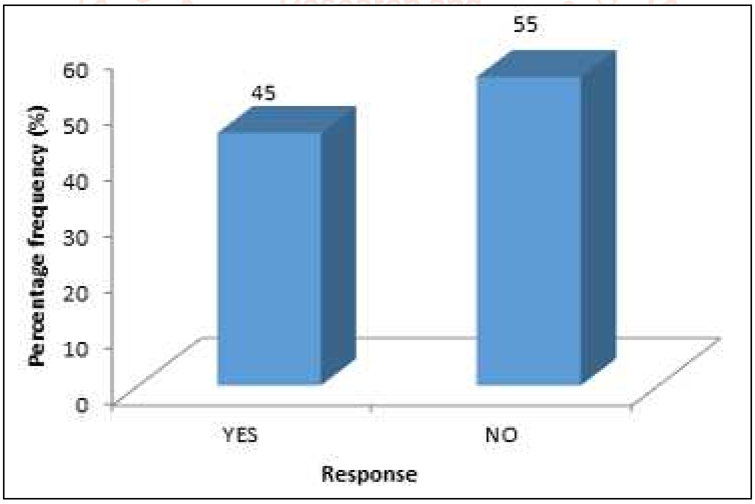

Figure 4.8: Worker Opinion on health education programme received.

From Table 4.9, majority of the workers (55%) have not received any health educational programme and this becomes obvious in Table 4.8 which shows that majority of the workers (55.8%) are not aware of the implications of accidents and injuries.

Table 4.10: Knowledge of workers on Financial Implication of Accident and Injury

Workers response	Frequency	%
YES	79	65.8
NO	41	34.2

Table 4.11: Opinion of workers on the use of Personal Protective Devices

Workers Response	Frequency	%
YES	53	44.2
NO	67	55.8

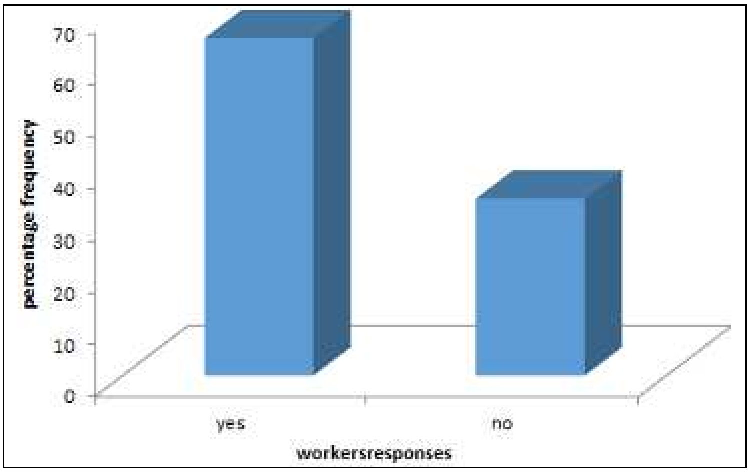

Figure 4.9: Knowledge of workers on financial implication of accident and injury

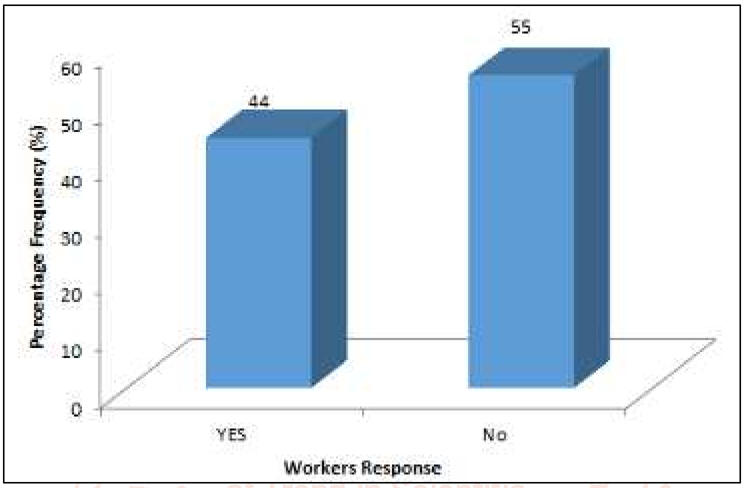

Figure 4.10: Knowledge of workers on the use of Personal Protective Devices

From Table 4.10 and Figure 4.9, it could be seen that majority of the workers (65.8%) are aware of the financial implication of accidents and injuries while majority (55%) do not have good knowledge on the use of personal protective devices as seen in Table 4.11 and Figure 4.10.

Table 4.12: Awareness of workers on the danger associated with workplace

Workers Response	Frequency	%
YES	58	48.3
NO	62	51.7

Table 4.13: Workers response on compliance with PPE use.

Workers Response	Frequency	%
YES	67	55..8
NO	53	44.2

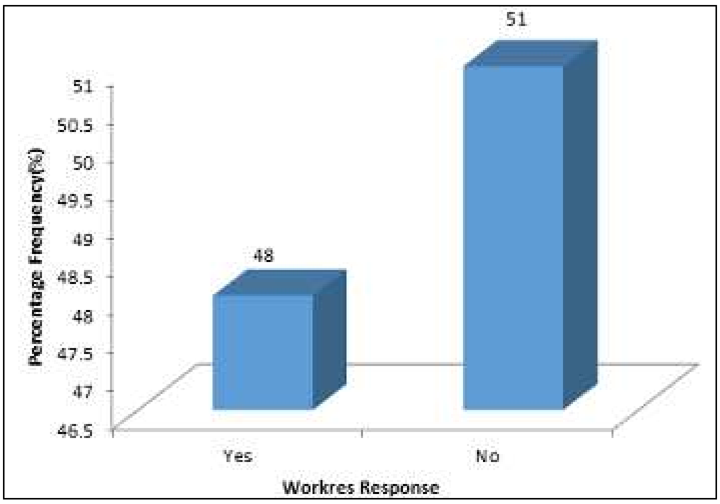

Figure 4.11: Awareness of workers on the danger associated with work place

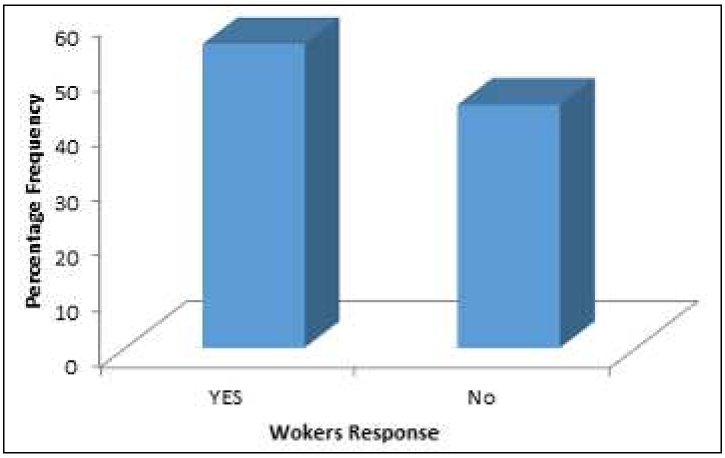

Figure 4.12: Compliance to PPE use by the workers

The lack of training on health education manifested in the workers' awareness on the danger associated with workplace as 51% of the workers are not aware of the dangers (Table 4.12 and Figure 4.11). However, Table 4.13 and Figure 4.12 show that among those with knowledge of the use of personal protective devices, majority of them (55.8%) comply to the use of PPE.

Table 4.14: workers' response on the awareness of safety measures on accident and injury prevention and control.

Workers' Response	Frequency	%
YES	59	49.2
NO	61	50.8

Table 4.15: Opinion of workers on commitment by management in providing PPE

Workers response	Frequency	%
YES	71	59.2
NO	49	40.8

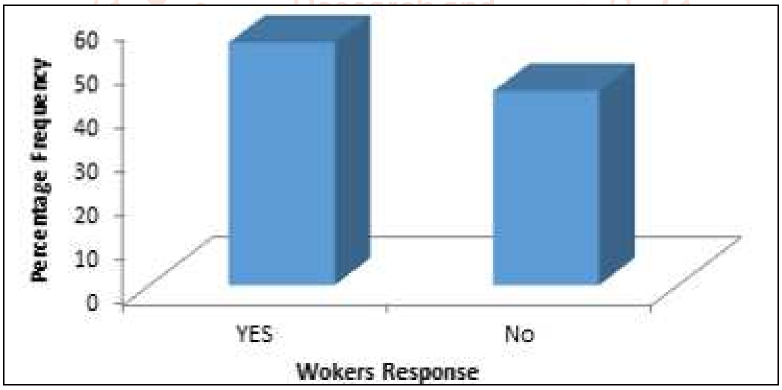

Figure 4.13: Awareness of workers on the importance of safety measure on accident and injury prevention

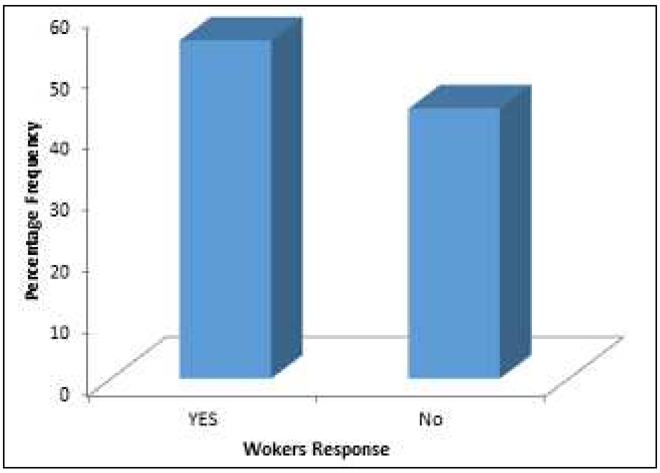

Figure 4.14: Opinion of workers on commitment by management in providing personal protective devices

From the results obtained as shown in Table 4.14, reasonable percentage of the workers (49.2%) are aware of the importance of safety measures on accident and injury prevention and 59.2% of workers are aware of commitment by management in providing personal protective devices (Table 4.15).

Table 4.16: Distribution of Personal Protective Devices (PPE) used by the workers

PPE	Frequency	%
Apron	19	15.8
Helmet	9	7.0
Hand glove	18	15.0
Goggles	11	9.2
Overall	2	1.7
Safety shoes	6	5.0
Facemask	55	45.8

Table 4.17: Distribution of subjects according to injury exposure

INJURY	FREQUENCY	%
Never Injured	0	0
Few (1-5 Times).	65	54.2
Above 5 Times	55	45.8

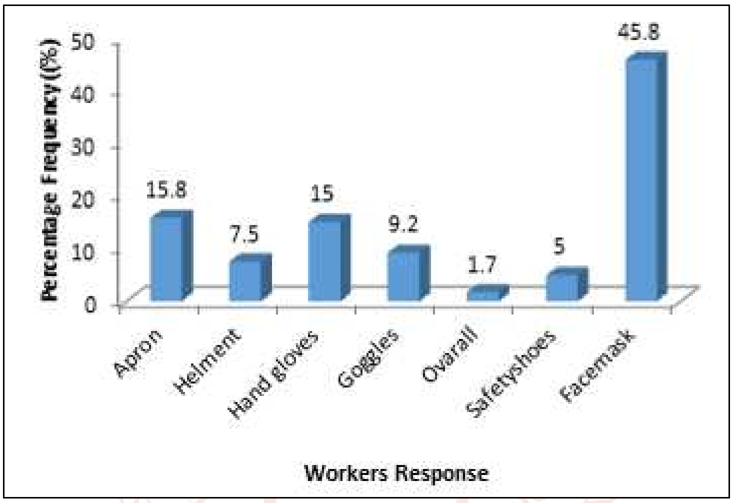

Figure 4.15: Distribution of personal protective devices used by workers

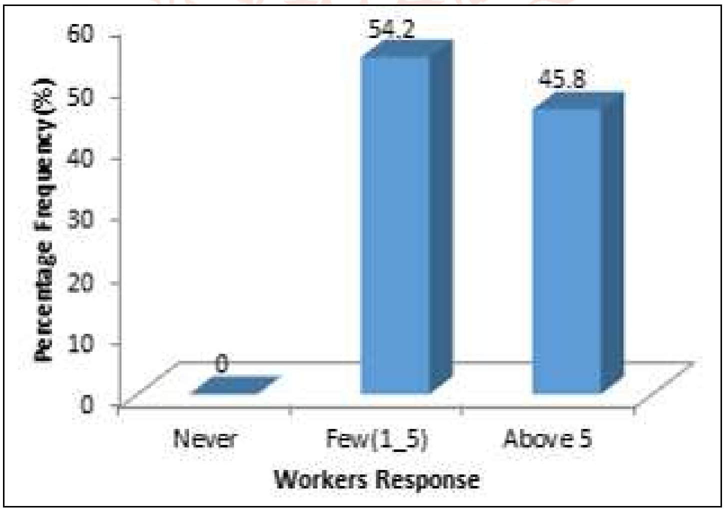

Figure4.16:Distribution of subjects according to injury exposure

Table 4.16 and Figure 4.15 show that management makes more effort in providing facemask, apron and hand gloves but neglect the provision of helment, safety shoes and overall.

Table 4.17 and Figure 4.16 reveal that every worker has been subjected to one form of injury or the other. 54.2% of the workers have been exposed to injuries at least five times while 45.8% have been injured more than five times.

Table 4.18: Distribution of subject according to degree of injury

Level of Injury	Frequency	%
Minor	67	55.8
Major	30	25
Severe	23	19.2

Table 4.19: Workers' response to the availability of Functional Health Service

Workers response	Frequency	%
Yes	70	58.3
No	50	41.7

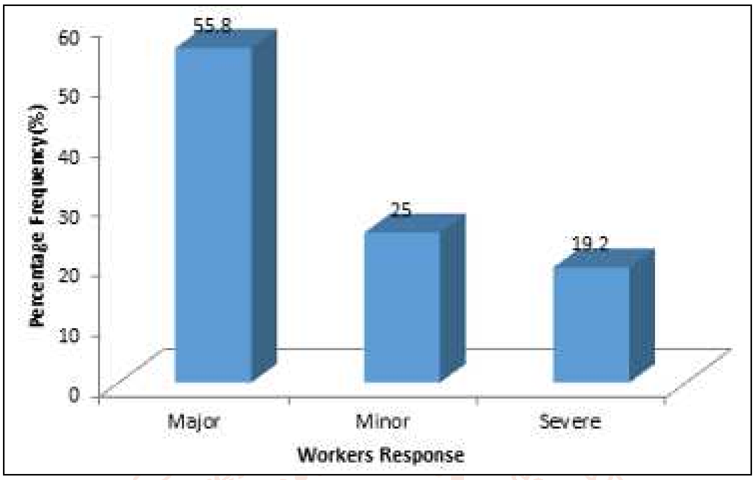

Figure 4.17: Distribution of Subjects According to Level/ Degree of Injury

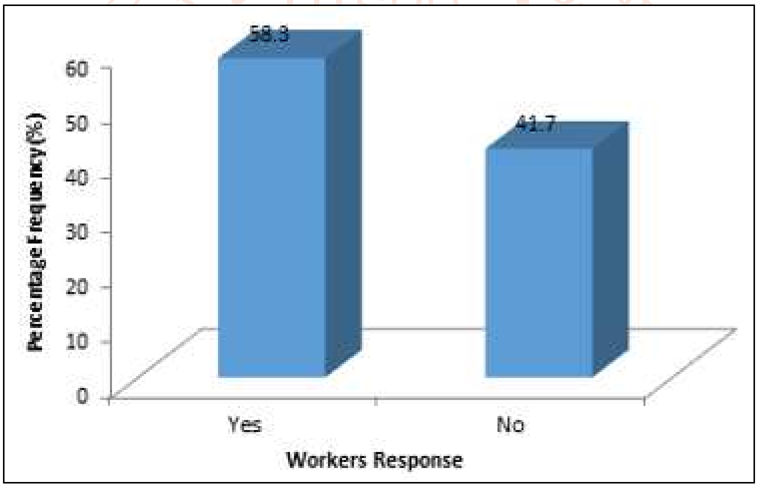

Figure 4.18: Workers response to the availability of Functional health services

On the degree of injury incurred by workers as shown in Table 4.18 and Figure 4.17, it can be seen that majority of the workers (55.8%) have had just minor injuries while 25% and 19.8% of the workers have been exposed to major and severe injuries respectively. Also, from Table 4.19, 58.5% of the workers claim that there is available functional health services in the company.

Discussion

Out of the 120 workers that were questioned, 75 (62.6%) were males and 45 (37.4%) were females. Majority of the workers (67.6%) were below 30 years of age. Thus, the mean age as shown in Table 4.3 is 30.73. Construction work requires agility, strength, steadfastness and maximum concentration; qualities that are more profound in the youth, hence, no surprise at the high percentage of the youths. Fatigue frequently sets in among the workers and they require some rest from time to time. Obviously, this is not a work for the elderly.

Among these workers, just 19.2% has acquired training in a tertiary institution. Most of them (65.8%) stopped at secondary education. They acquire their training either through a vocation (15%) or by learning on the job as an apprentice. This lack of proper training makes these workers unaware of the safety and preventive measures necessary for their work. Other researchers (Dong and Platner, 2004; Halperin and McCann, 2004; Lipscomb, et al., 2013) also reported a lack of proper training among construction workers.

From Table 4.6, only 15% of the workers have more than 10 years working experience. This goes to show that as the workers get older, they chose another line of work or get into managerial positions leaving the labor work for the young and inexperienced workers. Others may quit due to financial reasons as construction work does not pay much in Nigeria compared to the economic demands the workers face. They have to feed their family, pay their house rent, send the children to school and plan for the future. Their income may sustain them when they are young with fewer responsibilities, but can't sustain them when their families grow larger.

In this study, 45.8% of the workers wear face masks at the work site. This, off course, is due to the fact that a lot of the work has to do with construction of roads. Environmental pollutants in the air in the form of dusts, fumes from gases and chemicals used in construction work have harmful effects to the body when inhaled. This discovery is in line with the findings of other authors like Welch, et al., (2004) who examined beryllium disease among construction workers and revealed that 2.2% of the workers showed an abnormal beryllium test resulting from exposure, most likely during maintenance, repair, renovation, or demolition in facilities where beryllium was used; Akbar, et al., (2010), who examined the effectiveness of dust control method for suspended particulate matter exposure during manual concrete surface grinding and reported that concrete grinding exposes workers to unacceptable levels of crystalline silica dust, known to cause diseases such as silicosis and possibly lung cancer. Also, respiratory diseases from inhalation of asbestos and fumes were reported by Dement, et al., (2003) in their study.

When the workers were questioned on their knowledge of accident and injury prevention methods, 55.8% claimed to know the preventive measures while 44.2% was unaware of the preventive measures. This is in consonance with the findings of Lipscomb (2013) who reported that 58% reported some safety incentive and educational programs at their work place. Where workers are unaware of the preventive measures which is their right, the company can take advantage of their ignorance by not providing the necessary measures in order to cut costs. Also 55% of the workers have not received any educational program in their community concerning preventive measures of accidents and injuries at work place.

Personal protective devices are needed by construction workers to protect them from injuries. However, these devices do not provide 100% protection and as such fatalities do occur despite wearing these devices. No protective device can protect a worker from instant death when he falls from a high building during construction work. Dong, et al., (2013) found in their study that disproportionately high percentage (67%) of deaths from roof falls occurred in small construction establishments. Roofers, ironworkers, workers employed with roofing contractors, or working at residential construction sites, had a higher risk of roof fatalities.

Goggles, hand gloves, safety shoes and other protective devices used by the workers prove useful in different areas of specialty. The electrician working on electricity cables need to protect himself while making the required electrical connections to install power to the infrastructure. Electrocutions however, do occur at the work sites especially where they are not provided with adequate protection. McCann, et al., (2003) examined the causes of electrical death and injury among construction workers and reported that contact with "live" electrical wiring, equipment, and light fixtures was the main cause of electrical deaths and injuries among electrical workers, followed by contact with overhead power lines. Glazner, et al., (2005) examined factors contributing to construction injury and analyzed over 4,000 injury reports. They reported that environmental factors, slip/trip injuries and building materials contributed to more than 40% of injuries to workers in carpentry, concrete construction, glass installation, and roofing.

Workers at Haddock Quest Engineering and Construction Company located at Kano State, Nigeria are predominantly of the Northern tribe of Hausa. Their literacy level is quite low and so is their socioeconomic status. They do not have adequate health and medical facilities where they can get adequate health care in case of an emergency. There is also shortage of trained medical practitioners. People have to travel long distances from their work sites to well-equipped hospitals with trained medical personnel who can handle their cases. None of the workers reported never being injured at work. 54.2% has had a few injuries while 45.8% of the workers have had injuries more than 5 times. The severity of injuries sustained by the workers was however severe in 19.2% of the workers. Just above half (55.8%) reported their injuries to be minor and also just above half of the workers (58.3%) acknowledged availability of health services. Some of these injuries may lead to death either on the long run after months or years of medications or on the short term. Other researchers (McCann, 2003; McCann, 2004; Gittlemen, 2010) have reported deaths at construction places resulting from crane platforms, boom-

supported lifts, suspended scaffolds and electrocutions. The main causes of death according to McCann (2003) are falls, collapses and electrocutions. Welchi, et al., (2010) reported that medical and musculoskeletal conditions are strongly associated with work limitation, missed work, and reduced physical functioning and these factors are also associated with premature departure from the workforce. Participation in the community level can be quite helpful in education and positioning workers to be aware of safety conditions and protective devices. As reported by Forts, et al., (2013), community participation is a viable tool by which construction workers can be well educated and enlightened on the various prevention and control measures to ensure that accidents and injuries at the work place is reduced to a barest minimum.

Workers who have been disabled through injuries at the work place undergo rehabilitation to enable them live the rest of their life being productive. Some of these workers are denied benefits and abandoned to fend for themselves. They are not able to get another job due to their disability and they become a burden to their families who have to take care of them. This happens because most of these workers are illiterates and are not aware of their rights to adequate protective devices, they do not know that they have to hold the company liable for their disability in an event that protective devices were not provided. Others may not have the will or financial resources to seek justice in the law courts.

CONCLUSION AND RECOMMENDATIONS

Conclusion

From the results of this study, the following conclusions are drawn:

1. More than half of the workers at Haddoc Quest Construction Company are unaware of the accident and injury prevention methods.
2. About 40% of the workers do not use personal protective devices at work.
3. Face masks was the most common protective device worn by the workers.
4. Almost all the workers had suffered one form of injury, with 19.2% having suffered severe injuries at work.
5. Majority of these workers are illiterates and do not know the protective measures needed to avoid accidents and injuries.
6. There is lack of educational programs in their work place and community on the accident and injury preventive measures.

Recommendations

The following recommendations are made:

1. The government should ensure that all industries provide all necessary protective devices to their workers in order to maintain the state of good health and the workers should be trained or informed on how to use the equipment properly.
2. Victims of accidents should be rushed to well-equipped health facilities for quick intervention to save their lives and prevent disability.
3. Hospitals should be well equipped to be able to handle and rehabilitate accident victims at work places.
4. Health education should be encouraged to ensure the workers are aware of the dangers or effects associated with their working activities.
5. The government should ensure that all industries provide compensation and incentives to the victims of accidents and injuries in order to restore their incapacitated condition to the fullest standard of good health.
6. Routine health inspection of all occupation work setting should be maintained as much as possible by health inspectors/personnel.
7. Trained medical personnel should always be available at work sites to carry out medical treatment so as to avoid disabilities by the victims.
8. Seminars, workshop and conferences should be organized to enlighten the workers on the danger associated with work environment and the possible control measures

Contribution to Knowledge

The following are the contributions to knowledge

1. This study has established that the single most contributing factor to endangered safety at the work place is poor mentally and attitude of the short and long term effect of health hazards and accident.
2. And the only factor that can significantly reduce accident and exposure to hazards is massive orientation and discipline.

Suggestion for Further Research

Further researches are encouraged at all industries across the country in order to establish the level of work place accident and the attitude of workers toward them.

Limitation to the Study

1. Truthfulness of the workers in disclosing information required for this study.

2. The level of literacy among the workers made it difficult to properly understand and give accurate information on the questionnaire.

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